

## Drafting Operations for Engines

**Purpose:** To establish procedures to provide water supply from a static source at a fill site or dump site to support required minimum fire flow of 500gpm at the scene of a fire.

**Tactical Objective:** To establish a minimum water supply of 500gpm from a static source at a fill site or dump site. The driver candidate must maintain a prime until water supply is depleted.

**Background:** FRC policy and procedure identifies the deployment of at least three hand lines on IDLH fires: primary, back-up, and rapid intervention lines. Assuming that the typical MCFRS hand line is set to flow a minimum of 150gpm, then a minimum 500gpm water supply is needed to safely support a fire attack operation in an IDLH atmosphere. A 30-minute sustained flow is required based upon NFPA 1710 to ensure that an adequate water supply is provided for fire attack operations lasting greater than a few minutes. In non-hydrant areas, drafting operations will be needed to help deliver that water supply. Drafting operations may be needed at both the tanker dump site and the tanker fill site depending upon water supply sources available.

Drafting is a critical element in the rural water supply delivery system. In a tanker shuttle operation it is very possible that both the Dump Site Engine and the Fill Site Engine will draft from static water sources in order to deliver the needed fire flow. The three most common types of static water sources found in a rural water supply delivery are the open water source (pond, lake, or stream), the portable folding tank, and the dry hydrant system. This SOP addresses drafting from an open water source.

**Procedure:** Follow procedures for Fill Site Engine or Dump Site Engine as appropriate.

### Key Operational Considerations

- ❑ Static water supply sources should be preplanned and clearly identified on response area maps.
- ❑ When positioning the engine to draft, consider the stability of the ground surface, the vertical lift, and horizontal distance from water to pump.
- ❑ Vertical lifts over 10-feet significantly reduce pumping capacity. At a 20-foot lift, an engine's pumping capacity is reduced by 40%. Therefore, a 1500gpm engine can only pump 900gpm when drafting at a 20-foot lift.
- ❑ Horizontal distance has little effect on pumping capacity. Up to six, 10-foot sections of hard suction hose can be used horizontally with little overall effect on the pumping capacity.

- ❑ With a mid-ship mounted pump, the preferred connection for drafting is the driver side steamer, followed by the officer side steamer, followed by the front intake.
- ❑ Front intakes on mid-ship mounted pumps do not have a capacity rating for drafting.
- ❑ When drafting from open water static sources, floating-style strainers are preferred over barrel-type strainers because they remain debris-free longer, do not have a depth requirement, and minimize whirlpools.
- ❑ To prevent the pump from overheating circulate water back into the water supply using the trash line or pre-piped deck gun. If using the trash line, secure the line with the nozzle in the open position and control the flow at the pump panel. The use of a pre-piped deck gun as a circulating device requires a close evaluation of the available water supply and the fire flow needed.

## Dump Site Engine

**Purpose:** To provide an efficient method for Tankers to dump water at a dump site.

**Tactical Objective:** Develop and operate an efficient Tanker dump site with a sustained minimum fire flow of 500gpm for 30 minutes per NFPA1710.

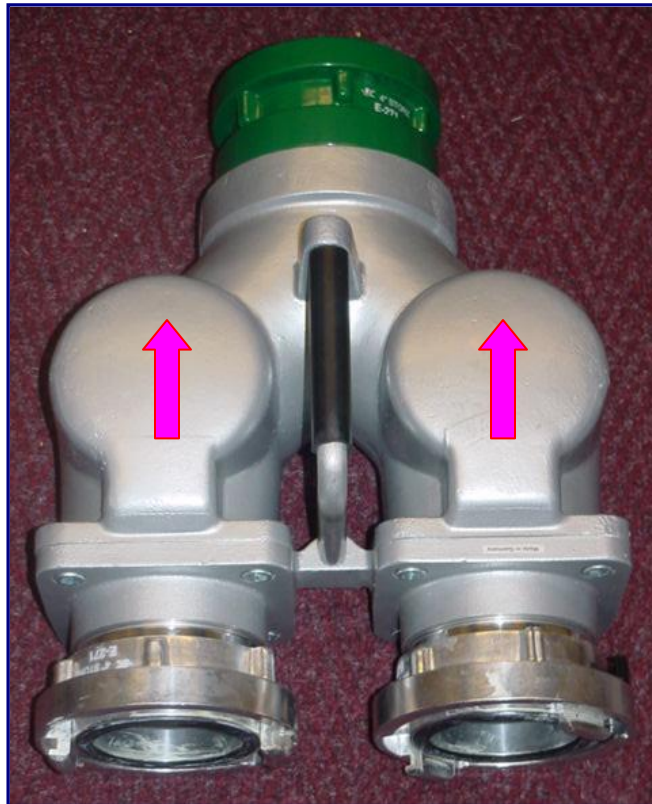


*Dump Site: Tanker with a rear dump and an Engine drafting out of portable folding tank*

**Background:** Water supply is a tactical operation, not a support operation. If the required fire flow is expected to be delivered, then the first arriving units need to be prepared to establish and maintain that flow. In the rural areas, the set up of a Tanker dump site is a time critical element in the overall water supply delivery process. This SOP is designed to provide the 500gpm flow for 30-minutes. A 1,000gpm flow is desired. FRC policy and procedure identifies the deployment of at least three hand lines on IDLH fires: primary, back-up, and rapid intervention lines. Assuming that the typical MCFRS hand line is set to flow a minimum of 150gpm, then a minimum 500gpm water supply is needed to safely support a fire attack operation in an IDLH atmosphere. A 30-minute sustained flow is required based upon NFPA 1710 to ensure that an adequate water supply is provided for fire attack operations lasting greater than a few minutes.

## Procedure

- ❑ The 3<sup>rd</sup> due Engine must immediately begin the set-up of the dump site by positioning the unit in a manner that allows for maximum access for the portable folding tanks and Tankers.
- ❑ Ensure that the Attack Engine has laid a supply line with a manifold or clappered siamese and is ready to receive water.



*4" to two 4" clappered siamese carried by all Engines in Montgomery County*

- ❑ Connect a supply line from 3<sup>rd</sup> Engine to the clappered Siamese.
- ❑ Deploy the first available folding tank and place it at the end of the driveway.
- ❑ Connect one section of hard suction hose to a low-level strainer.
- ❑ Have the 2<sup>nd</sup> due Tanker dump half their water into the folding tank and attempt to achieve a prime. The Tanker can supply their remaining water into the clappered siamese if prime is not achieved.
- ❑ Once prime is achieved open discharge and supply clappered Siamese to the Attack Engine.

- ❑ Have Tanker dump remaining water into the folding tank and go to fill site and fill up and return to dump site.
- ❑ Have remaining Tankers drop their folding tanks next to the first in series. Diamond shape is preferred especially if Tankers dump off the rear only.
- ❑ Set up jet siphoning devices to move water from one folding tank to the next until it reaches the 1<sup>st</sup> folding tank from which the 3<sup>rd</sup> Engine has a prime.



*Jet Siphoning Device with 1 ½" hose line*

### **Key Operational Considerations**

- ❑ Layout instructions are announced via radio to clearly identify where the supply line is being laid. Example:  
*"Engine 131 is laying out from the driveway of 24000 Ridge Rd".*
- ❑ A single 3" supply line will support 500gpm no farther than 600-feet without excessive friction loss and pump discharge pressures.

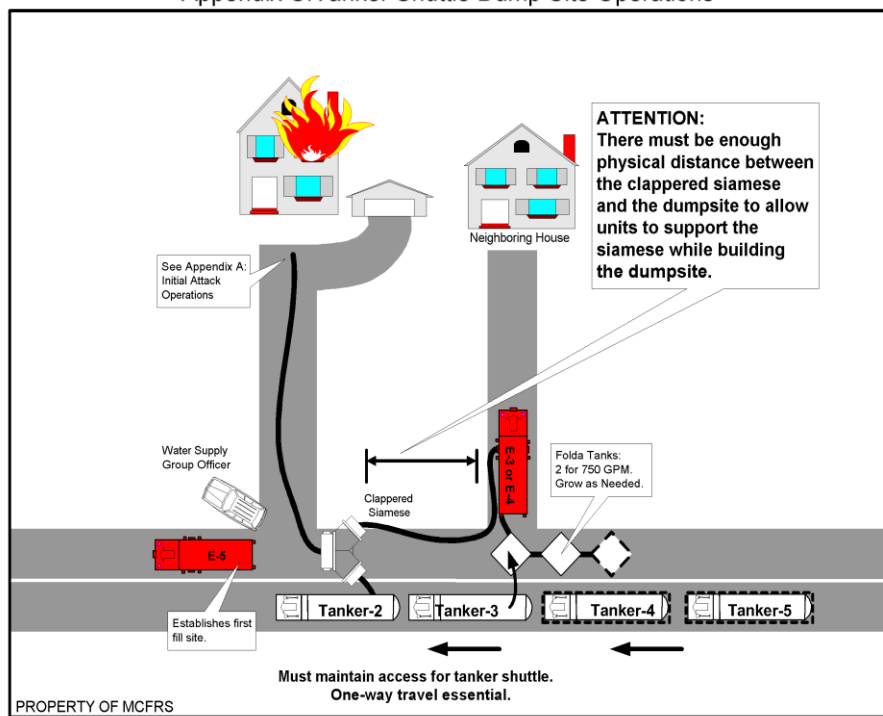
- ❑ Folding tanks at a dump site should be set up in a diamond shape. This as a consideration for Tankers that only dump off the rear. The diamond shape allows for Tankers to back up on the road and not have to get off the road as much or at all to dump. This shape also makes it less likely for a Tanker wheels to strike the folding tanks while driving up along side to dump their water from a side dump. Folding tanks may bulge out slightly along the side while full and maybe hard to avoid in the dark or on roads with narrow access.
- ❑ Per the FRC Policy 24-07; *Water Supply SOP in Areas Without Available Water*, set up two folding tanks per 750gpm of fire flow required on the fire ground.
- ❑ Desired Dump time from a Tanker is two to three minutes.
- ❑ Smaller capacity Tankers that are holding up larger Tankers from dumping should be told to stop dumping and go directly back to the fill site. Never leave larger capacity Tankers waiting to dump.
- ❑ Jet siphoning devices move water from one folding tank to another at about 800gpm-1,000gpm flow at approximately 100psi.
- ❑ If possible 3<sup>rd</sup> Engine should get a prime out of the largest available folding tank at the dump site.
- ❑ Water Supply Group Officer is usually 2<sup>nd</sup> arriving command officer. He should be located at the dump site. 3<sup>rd</sup> Engine may have to assume this role until their arrival.
- ❑ Per the FRC Policy 24-07; *Water Supply SOP in Areas Without Available Water*, Do not run over charged supply line(s) in the driveway. Units using LDH must move hose out of the side of the road/driveway before charging the line.
- ❑ Drivers should not have to get out of cab at dump site on most Tankers. This slows the shuttle down considerably. Dump site personnel need to manage this operation.
- ❑ Maintain only one dump site. Multiple dump sites are not recommended.





*Portable folding tanks at a dump site*

#### Appendix C: Tanker Shuttle Dump Site Operations



## Fill Site Engine

**Purpose:** To establish an efficient and adequate water supply to Tankers in a shuttle at a fill site.

**Tactical Objective:** To provide Tanker fill sites to support a minimum fire flow of 500gpm for 30 minutes per NFPA 1710. Fill site Engine will fill Tankers at a rate of 1,000gpm.

**Background:** The fill site needs to fill Tankers at a rate to provide the dump site with the required water to supply the fire attack at the scene. FRC policy and procedure identifies the deployment of at least three hand lines on IDLH fires: primary, back-up, and rapid intervention lines. Assuming that the typical MCFRS hand line is set to flow a minimum of 150gpm, then a minimum 500gpm water supply is needed to safely support a fire attack operation in an IDLH atmosphere. A 30-minute sustained flow is required based upon NFPA 1710 to ensure that an adequate water supply is provided for fire attack operations lasting greater than a few minutes. The use of multiple fill sites is recommended. Desired fill rate for Tankers is about 1,000gpm and should take 2 to 3 minutes depending on the size of the Tanker. Tankers should not have to wait to fill up.

### Procedure:

- ❑ Fill site Engine initiates an adequate water supply to fill Tankers at a rate 1,000gpm.
- ❑ Ensure adequate access and egress from fill site. It is desired for Tankers to not have to turn around if possible. Looped route is desired in a shuttle.
- ❑ Hook to a municipal source or draft from a static source.
- ❑ Set up two fill stations per fill site. This allows one Tanker to connect while the other Tanker disconnects. If the flow is adequate we can fill two Tankers simultaneously.
- ❑ Use LDH manifold or gated wyes to fill Tankers. The LDH 4" stortz connections are desired for quick connect and filling capability.



*5"stortz and four 2 ½" NST gated manifold*





*5"stortz and 4"stortz gated manifold*

- ❑ Fill Tankers at a rate of 1,000gpm.

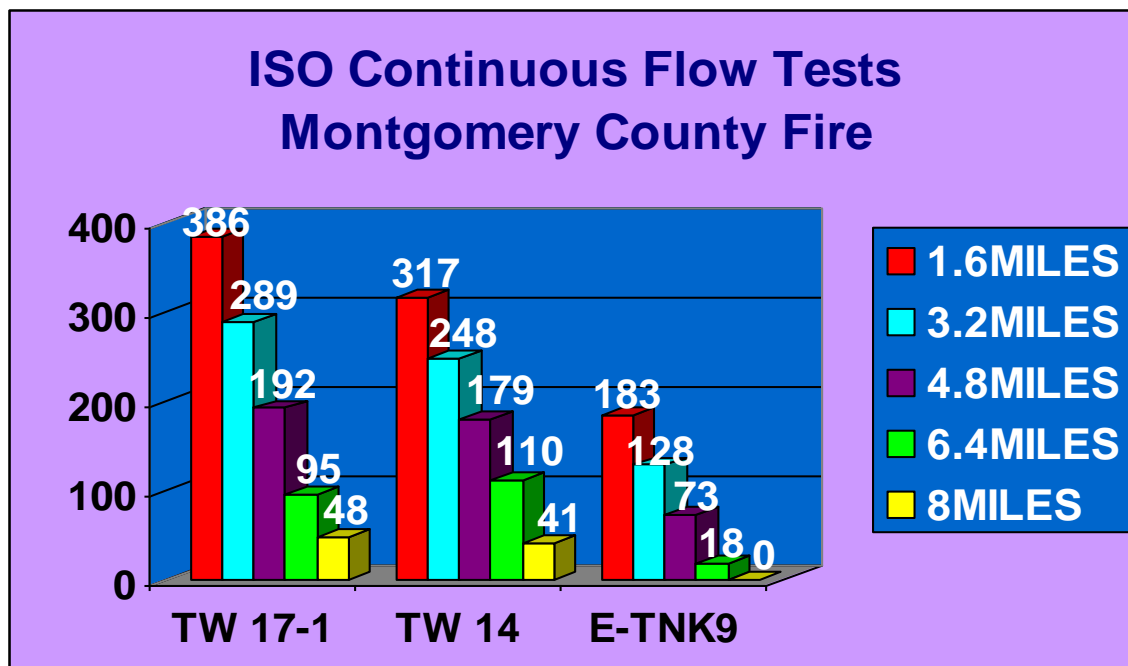


*Rear tank fill on a Tanker*

- ❑ Tanker drivers should remain in their cabs. Filling operations is completed by fill site personnel.
- ❑ Once one fill site is in service additional fill sites should be placed in service.

### Key Operational Considerations:

- ❑ Set up two filling stations per fill site from a reliable site capable of supplying the required flow for filling Tankers.
- ❑ Fill Tankers at 1,000gpm, 2-3 min to fill 35psi + FL (hose) + FL (device) + HP
- ❑ Multiple fill sites are desired from either municipal or static water sources.
- ❑ The longer the Shuttle route the less flow (gpm) a shuttle can maintain at the fire scene.
- ❑ This Chart of an ISO Flow Test shows how increasing the round trip distances of Tankers decreases the flow (gpm) we can maintain from each size Tanker in a shuttle.



- ❑ Tanker shuttles may be more efficient if apparatus does not have to turn around at fill site or dump site. It may be more beneficial to have a route planned out for the shuttle that allows drivers to loop back around to the dump site in one direction.
- ❑ Tanker drivers should not have to get out of cab at fill site. Filling should be done by the fill site personnel. If drivers get out it slows operation down considerably.
- ❑ 4<sup>th</sup> or 5<sup>th</sup> Engines on initial assignments may be asked to maintain a fill site. The water supply task force Engine may also be asked to maintain an additional fill site.



*One fill site with 2 fill stations. One Engine company and a portable pump 100ft apart.*







*Two fill sites using two Engines at one stream.*



*One fill site 2 fill sites using two Engines at one stream.*



## Montgomery County Fire & Rescue Service Montgomery County, Maryland

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### Water Supply SOP In Areas Without Available Water Supply



In recent years, we have seen expanded growth in the areas of Montgomery County without water supply. Unfortunately, much of that growth has occurred in our non-hydrant areas and has consisted of large, residential occupancies constructed of light-weight building materials. The combination of no municipal water and light-weight construction has challenged MCFRS' ability to provide adequate fire fighting services in these newly developed areas.

#### **VIII. STRUCTURAL FIREFIGHTING IN AREAS WITHOUT MUNICIPAL WATER SUPPLY.** (This section inserted from FRC Policy 24-07AMIII)

The standard dispatch for a structure fire in a non-hydranted area is five engines, three tankers, two aerial units, one rescue squad, one EMS unit, and four command officers. Three Command Officers is the minimum Command Officer response. This section of the SOP establishes a procedure for structure firefighting in areas of the County that lack fire hydrants close to the fire. The procedure is a modification of the SOP for hydranted areas, and emphasizes supporting the fire attack of the initial arriving engine, with an uninterrupted, expandable water supply using rural water supply tactics.

**NOTE:** Units arriving on a scene where large diameter hose (LDH) is deployed must move the LDH to the side of the road, driveway, etc., before charging the line.



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## WATER SUPPLY SOP IN AREAS WITHOUT AVAILABLE WATER SUPPLY

### A. First Due Engine

1. **Unit:** Initiate the water supply process by laying a supply line connected to the units clappered Siamese. This hose lay must begin at the driveway entrance to the involved structure, or from the nearest area suitable for dump site operations. The location of this site must be identified in the units on-scene report.
2. **Unit Officer:**
  - a. Determine and advise whether a tanker shuttle or relay operation will be implemented for the water supply. Advise the water source for the shuttle or relay operation so the fifth due engine can position there and establish a fill site or relay water source. **NOTE:** If the water source is accessible and located within 3000 feet of the first engine's Siamese, a relay operation is the preferred water supply option.
  - b. Direct other incoming engines and tankers to support the initial attack until a water shuttle or water relay is developed.
  - c. On arrival, give reports in accordance with Section 4.IV. of this SOP.
  - d. All firefighting operations must adhere to the requirements of Section 4.I. of this SOP.
3. **Crew:** Advance a hand line to the fire floor and begin rescue, fire attack, confinement, or exposure protection as appropriate.
4. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

### B. Second Due Engine

1. **Unit:** Position the engine close to the attack pumper and supply tank water to the attack pumper as necessary. Leave clear access to the driveway for the first arriving Tanker and Aerial Unit. **NOTE:** As the second due engine positions, the crew may need to move the supply line(s) from the middle of the road or driveway.
2. **Unit Officer:** Conduct a recon of available water sources close to the structure, e.g., swimming pools, ponds, etc. near the involved structure.
3. **Crew:** Advance a hand line and back up the first due engine.
4. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

### C. Third Due Engine

1. **Unit:** Position the engine to allow the first tanker and the first aerial unit to position close to the structure, while best positioning either for dump site, or relay operations, as directed.
  - a. **For Dump Site Operations:** Position the unit to draft from folding tank(s). This position must allow the pumper to draft from the folding tanks, and enable the tankers to fill the folding tanks, preferably using their side dumps. Connect the clappeder Siamese and leave the supply line uncharged until ordered to charge. Try to enable first due tanker and aerial unit to position close to the structure before charging supply line.
  - b. **For Relay Operations:** Position as necessary to initiate the relay.
2. **Unit Officer:** Place into operation the initial dump site operations, or perform relay operations.
3. **Crew:** Manage dump site operations.
4. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

### D. Fourth Due Engine

1. **Unit:** Locate the unit in an uncommitted position. The unit may be directed to:
  - a. operate as a draft pumper to support the initial attack from a static water source; or
  - b. begin laying supply lines for water relay operation, as directed.
2. **Driver:** Be prepared to pump water to the clappeder siamese to support the attack pumper, and stand by for instructions from the WSGO. Be prepared to assist driver of the third due engine to create a dump site.

### 3. Crew:

- a. Report to the IC and advise you are the RIC. Unless specifically ordered otherwise, assume the operations of the RIC.
  - b. Secure an additional hose line and immediately relieve the Standby Team to become the RIC. This is usually done face-to-face, but on larger scale incidents, it may be done by radio.
  - c. Determine the location of the fire and it's progression.
  - d. Monitor all critical operational talk groups and the FDTA channel.
  - e. Observe fire conditions, note fire attack progress, and know the location of the crews working in the building.
  - f. Determine the occupancy type and building construction.
4. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

### E. Fifth Due Engine

1. **Unit:** Establish the first fill site. Do not respond directly to the scene.
2. **Unit Officer:** Place into operation the initial fill site or relay water source as identified.
3. **Crew:** For fill site operations, set up at least two LDH supply lines with quarter-turn ball valves attached, capable of filling tankers at a minimum rate of 500 GPM each. Maintain fill site operations; establish water supply connections for incoming apparatus.
4. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

### F. First Due (Nurse) Tanker

1. **Unit:** If staffing permits, drop off portable tank at the end of the driveway or near the clappered Siamese. Position the unit near the first due engine and connect the supply line to the tanker, and from the tanker to the first arriving engine. Supply the first due engine with tank water, and transition to supplying water from the dump site or relay source as one becomes established. Try to maintain a full tank of water in case the supply is interrupted.
3. **Crew:** Assist the driver with water supply operations.

## **G. Second Due Tanker**

1. **Unit:** The primary responsibility for this unit is to support the fire attack by immediately pumping the Siamese, and continuing to pump the Siamese until it runs out of water. The tanker will leave its folding tank and all appropriate appliances to be used in developing dump site operations at the dump site. If the third engine is not in a position to set up the dump site, the second tanker should supply the Siamese from a position that allows the third engine and third tanker access to the dump site.
2. **Crew (if staffing is available):** Assist the driver with water supply operations.

## **H. Third Due Tanker**

1. **Unit:** Support the fire attack by pumping the Siamese until the dump site is operating. If the third due engine is in a position to begin development of the dump site, the third due tanker should position to set up the folding tank and dump enough water for the third due engine to achieve a draft. If the third due engine is successful in drafting, then transition can be made from tankers supplying the Siamese to the third due engine supplying the Siamese from folding tanks. When the third due engine is successfully drafting, dump remaining water into the folding tank and move to the fill site. If in relay operations, support the Siamese until the relay is in service.
2. **Crew (if staffing is available):** Assist the driver with water supply operations.

## **I. First Due Aerial Unit**

1. **Unit:** Position the unit on Side A, or in the area of highest priority to accomplish rescue operations. Provide roof access/egress; or deploy a defensive, elevated stream. If this location impedes incoming water supply units, position the unit elsewhere, e.g., in an adjoining driveway.
2. **Crew:** Perform duties outlined in Section 4.VII.g. of this SOP.
  - 3. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment.

## **J. Second Due Aerial Unit**

1. **Unit:** Position on the main road, or in a location that does not impede the access/egress of tankers.
2. **Crew:** Perform duties outlined in Section 4.VII.g. of this SOP.
3. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

## **K. Rescue Squad**

1. **Unit:** Position on the main road, or in a location that does not impede the access/egress of tankers.
2. **Crew:** Perform duties outlined in Section 4.VII.g. of this SOP.
3. **Equipment:** Includes SCBA, portable radios, tools, hose, and other equipment appropriate for the structure's construction and operational tactics.

## **L. Ambulance or MICU**

1. **Unit:** Position at the incident scene to facilitate the positioning of other apparatus.
2. **Crew:** Establish an aid station on Side A.
3. **Equipment:** All units must carry a litter, oxygen equipment, first aid kit, a burn kit, and ALS equipment (Medic Unit Only). If the crew is used as a Standby Team, all personnel must wear full PPE and carry hand lights.

## **M. First Arriving Command Officer**

1. **Unit:** Position on Side A, leaving space for additional apparatus.
2. **Officer:** Establish a Command Post and assume command of the scene in accordance with Section 4.V. of this SOP. Once a formal Command Post has been established, assign a WSGO as soon as possible.
3. **Equipment:** Wear, or have immediate access to full PPE and SCBA.

**N. Water Supply Group Officer:** Locate available water sources and position to coordinate water supply operations. The Water Supply Group should operate on a separate talk group.

**O. Water Supply Task Force:** Upon the indication of a working structure fire in a nonhydranted area, or at the request of the IC, ECC will dispatch a Water Supply Task Force consisting of one additional engine and three additional tankers.



**P. Water Supply Task Force Engine:**

1. **Unit:** Report to and develop the second designated fill site location as directed by the WSGO.
2. **Crew:** Set up at least two LDH supply lines with quarter-turn ball valves attached, capable of filling tankers at a minimum rate of 500 GPM each. Maintain the fill site operation, establish water supply connections for incoming apparatus.
3. **Equipment:** Wear appropriate PPE for fill site operations.

**Q. First Due Tanker from Water Supply Task Force:**

1. **Unit:** Support the fire attack by supplying the clappered siamese, or by dumping into portable tanks at the direction of the WSGO. Drop off the portable tank, water, and appliances as directed; proceed to the fill site.
2. **Crew (if staffing is available):** Assist the driver with water supply operations.

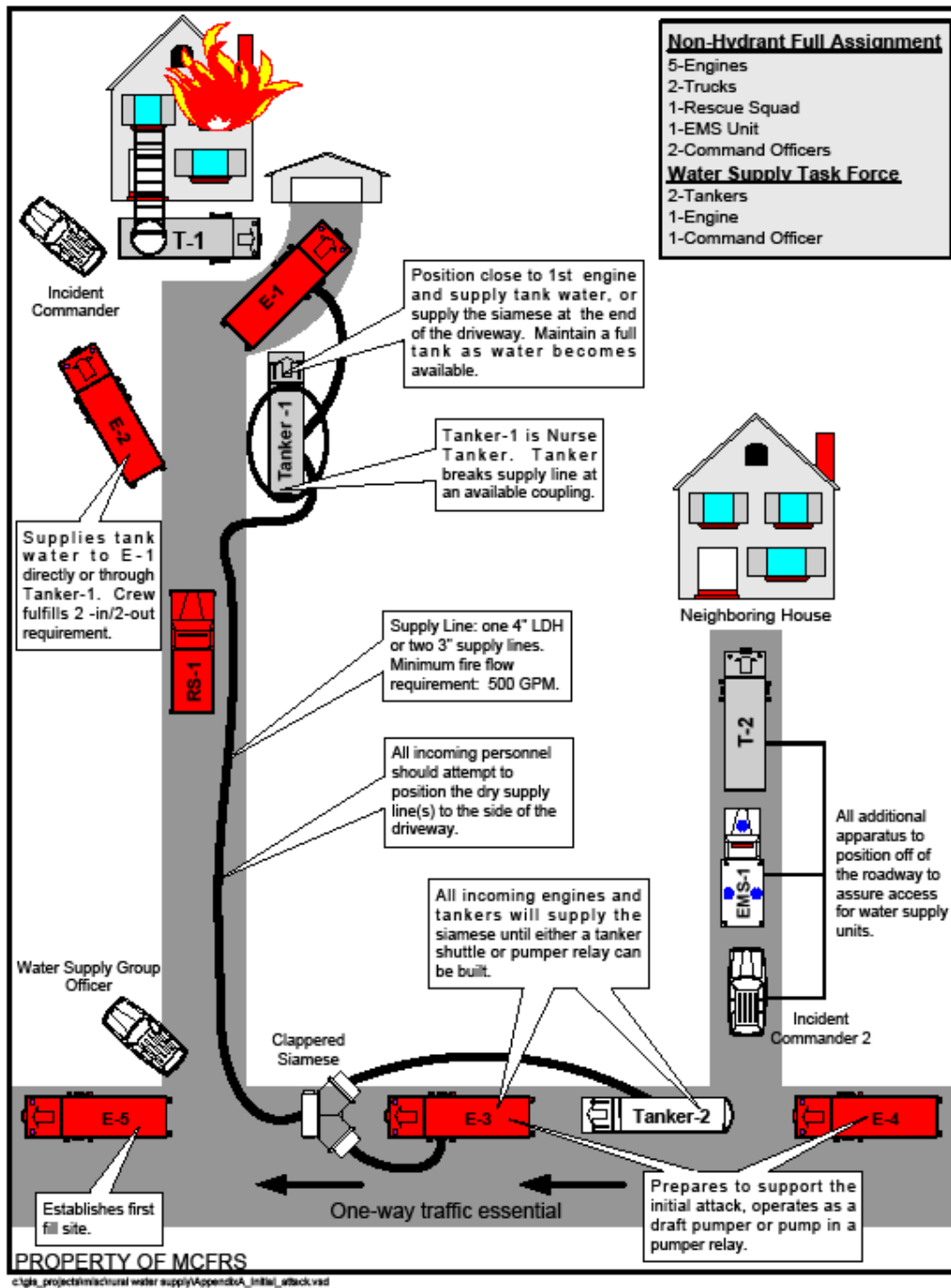
**R. Second Due Tanker from Water Supply Task Force**

1. **Unit:** Support the fire attack by supplying the clappered siamese, or by dumping into the portable tanks at the direction of the WSGO. Drop off the portable tank, water, and appliances as directed; proceed to the fill site.
2. **Crew (if staffing is available):** Assist the driver with water supply operations.

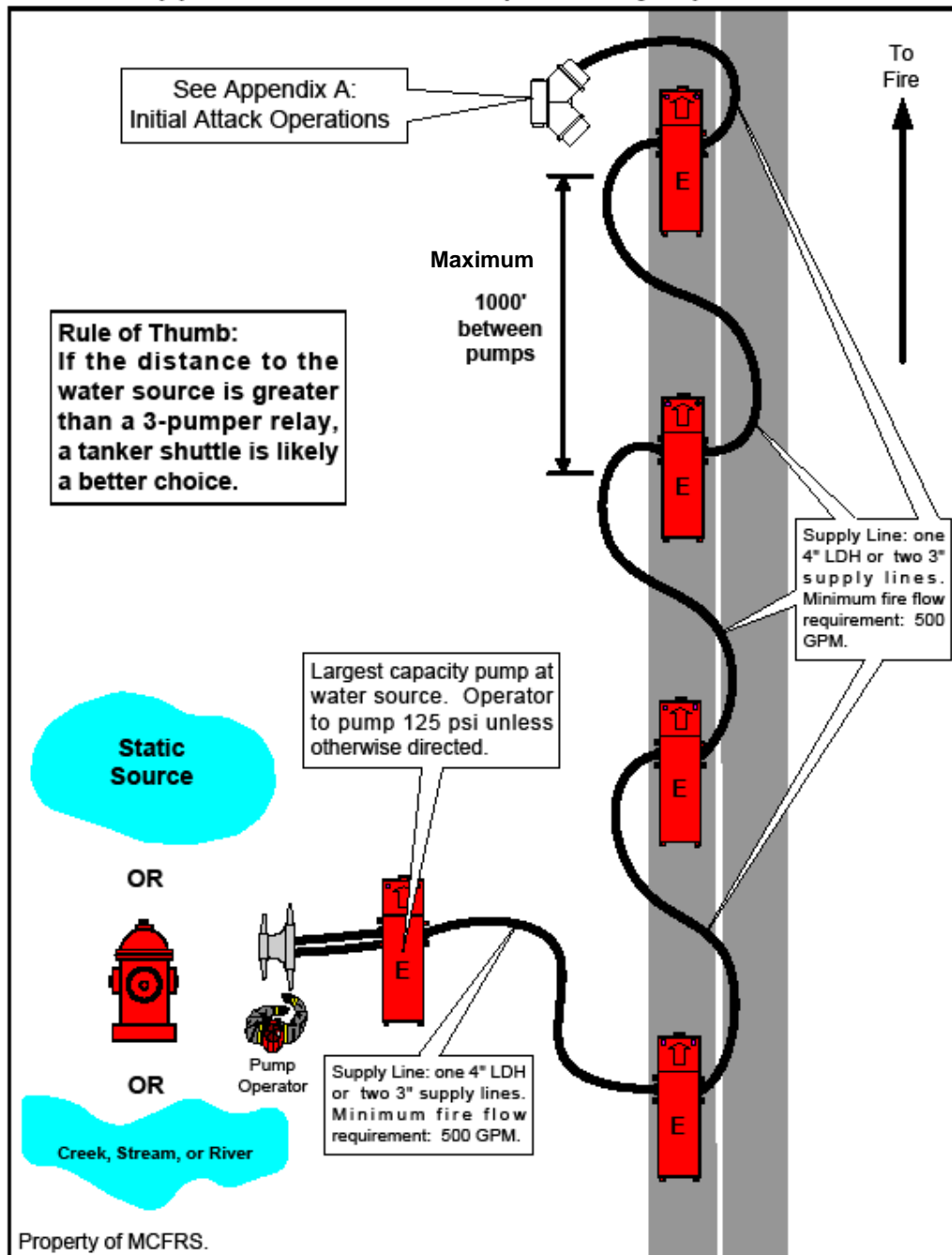
**S. Third Due Tanker from the Water Supply Task Force:**

1. **Unit:** Support the fire attack by supplying the clappered siamese, or by dumping into the portable tanks at the direction of the WSGO. Drop off the portable tank, water, and appliances as directed; proceed to the fill site.
2. **Crew (if staffing is available):** Assist the driver with water supply operations.

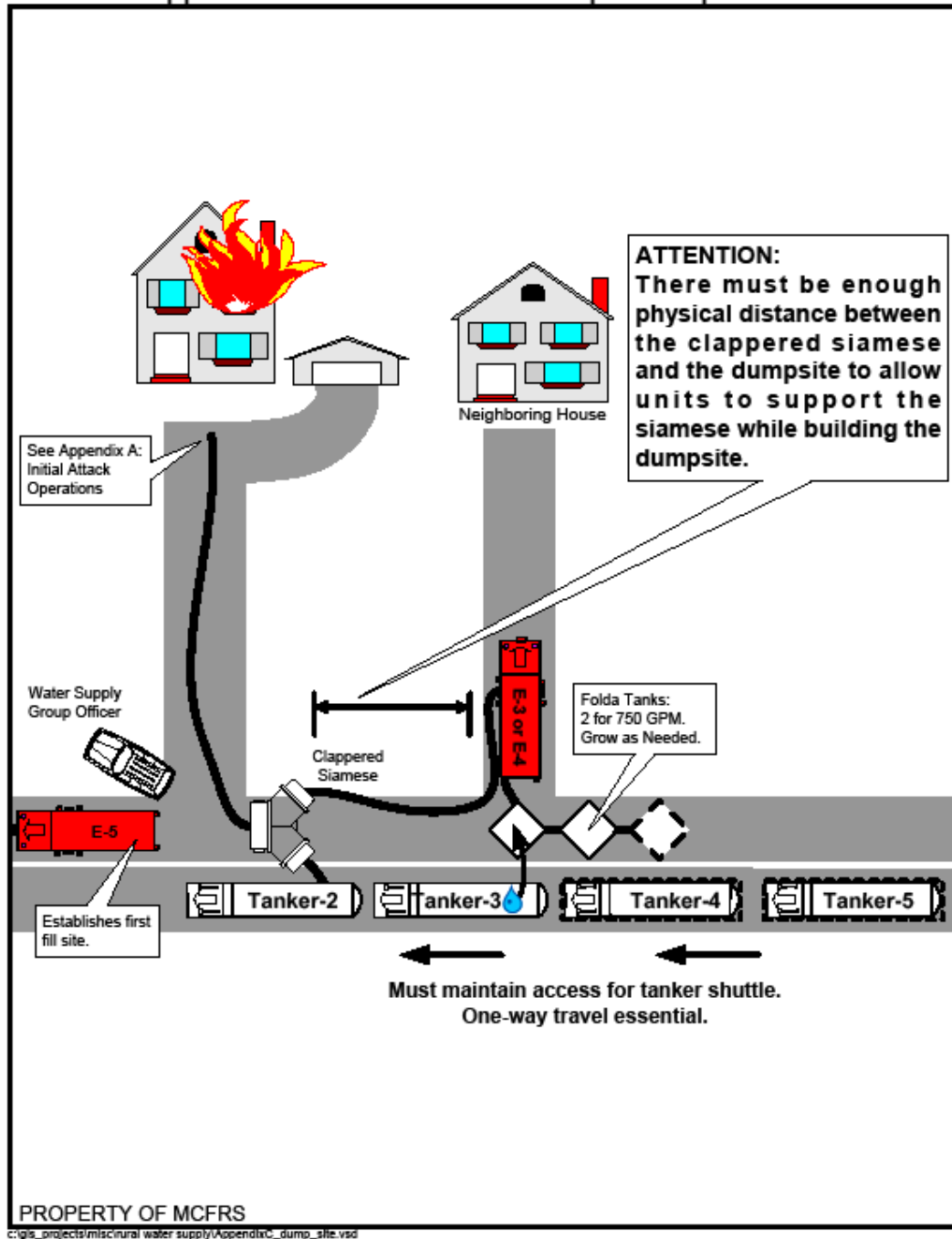
## Appendix A: Initial Attack Operations



## Appendix B: Multi-Pumper Relay Operations



## Appendix C: Tanker Shuttle Dump Site Operations



## Appendix D: Fill Site Operations

